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AN APPRAISAL OF THE BOMBING OF NORTH
VIETNAM THROUGH 14 JULY 1966 *

SUMMARY

1. (S/NFD) The most significant air strikes of June and early July were conducted against the major bulk POL storage facilities. Analysis of data available through 9 July indicates that the air strikes resulted in the loss of about one-half of the preraid targeted capacity which existed on 28 June.
2. (S) A high level of road interdiction attained nearly four times as many road cuts and cratered segments as the previous month with a record number of trucks, ferries, and rolling stock destroyed or damaged. Through rail service probably is not possible on at least three and perhaps four of the five major railroad lines in North Vietnam, although rail shuttle service continues on all lines. Miscellaneous military targets, including SAM sites and naval craft, were also struck.
3. (S) The cumulative effects of the bombing since March 1965 have placed some strains on North Vietnam, particularly in the economic areas, but on the whole the North Vietnamese have been able to meet their military needs and to support the insurgency in South Vietnam, although their capability for overt military aggression has been limited.

* This report is prepared jointly by DIA and CIA.

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4. (S/NFD) The recent US air strikes against targets in the Hanoi-Haiphong area do not appear to have weakened the North Vietnamese leadership's resolve to continue to prosecute the war. At the same time, the Hanoi leadership appears to be taking note of the effects the bombing raids are having on popular morale and is initiating steps to prevent or curb, if possible, any decline in the fighting spirit of the people. ~~Regime concern over the status of morale may reflect its realization that the cumulative effects of the bombing raids are now beginning to be felt by large segments of the~~ population. Presently, however, there continues to be no hard evidence of real alarm in Hanoi or that morale in North Vietnam has slipped to the extent that it would force the regime to change its policy of continuing the war.

5. (S/NFD) The attacks on the petroleum facilities will make the operation of the economy more difficult and costly. Even before these attacks, the bombings were causing increasing disruption of economic activity. Food shortages and rising food prices apparently are becoming more prevalent throughout North Vietnam. The economy, nevertheless, is still able to provide the essential needs of the population. Measurable cumulative direct and indirect losses caused by the air strikes now amount to about \$100 million.* In

* US dollars are used throughout this memorandum.

addition, there are other losses and costs to the economy and the military establishment which have developed as a consequence of the air strikes but to which values cannot be assigned.

Effects on Military Targets

1. (S/NFD) In June and early July 1966, the most significant air strikes were conducted against the major bulk POL storage facilities. A high level of road interdiction was also maintained with nearly four times as many road cuts and cratered segments as there were last month. A record number of trucks, ferries, and rolling stock were destroyed or damaged. Major rail lines were struck during this period and heavy strikes were made on the intra-coastal waterway between Thanh Hoa and Vinh. Miscellaneous military facilities, including SAM sites, were also struck. The cumulative effects of the bombing since March 1965 have placed some strains on North Vietnam, but on the whole the North Vietnamese have been able to meet their military needs and to support the insurgency in South Vietnam, although their capability for overt military aggression has been limited. Cumulative totals of damaged and destroyed targets are shown in Tab A.

2. (S/NFD) Preliminary analysis of photography available through 9 July, indicates that the air strikes which began on 29 June against the principle North Vietnamese petroleum storage facilities resulted in the loss of about one-half of the preraid JCS targeted capacity of these facilities existing on 28 June. The bombing has also denied the

use of certain of the support facilities at Haiphong, the only important terminal for receiving ocean-going tankers, and all petroleum support facilities as well as storage capacity, were destroyed in Hanoi, which serves as the most important center for internal distribution of petroleum products. As long as the jetties and some storage capacity remain at Haiphong, some use of this terminal is possible. To the extent that sufficient supplies cannot be imported through Haiphong, other means of distribution can be employed including delivery to South China and transport from there by rail, truck, or coastal shipping to the remaining storage sites in North Vietnam. These substitute procedures, however, will increase significantly the unit cost of petroleum imports; and higher costs of internal distribution of petroleum will result from the loss of bulk storage facilities and the consequent need for greater use of drums and other small containers.

3. (S/NFD) Imports of petroleum products by North Vietnam in June were some 20,000 tons less than scheduled because of the effects of air strikes. One Soviet tanker scheduled to arrive at Haiphong was diverted to Shanghai while en route -- apparently because bomb damaged transport facilities could not transfer POL from Haiphong to the interior as rapidly as shipments were received at the port. Another tanker was diverted to the Communist Chinese port of Fort Bayard without offloading in Haiphong after the first air strikes eliminated much of the capacity at Haiphong, Do Son, and Hanoi. A third tanker,

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in North Vietnamese waters at the time of the bombings, had discharged its cargo.

4. (S) Through rail service probably is not possible on at least three and perhaps four of the five major railroad lines in North Vietnam, although rail shuttle service continues on all lines. Only the Hanoi-Thai Nguyen line is definitely open for through traffic. Three spans of the Viet Tri railroad/highway bridge on the Hanoi-Lao Cai rail line and at least one small bridge north of Viet Tri recently have been destroyed, disrupting through rail service between Hanoi and the important industrial centers of Lam Thao and Viet Tri as well as between Hanoi and Lao Cai. The Red River, however, serves as an alternate line of communication for these cities. On the Hanoi-Dong Dang line pilots reported a span destroyed on the Cao Nung railroad bridge on 11 July. The Bac Giang railroad/highway bridge on this line was restruck on 4 July but the effects of the strike have not as yet been ascertained. The status of through rail service on the Hanoi-Haiphong line is uncertain. The Hai Duong railroad/highway bridge on this line was restruck on 10 July but no assessment of damage has been made. The rail bypass bridge at Hai Duong is unserviceable. The Hanoi-Vinh rail line is open to through traffic at least as far south as the Thanh Hoa area, with rail shuttle service undoubtedly continuing on the southern sections of the road.

5. (S/NFD) Since the inception of the ROLLING THUNDER Program,

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a total of 47 different railroad bridges and combination rail/highway bridges have been destroyed, some more than once. Restoration of bridges or the use of bypasses have largely offset these losses. Simplicity of construction, improvisation, and mass use of labor have made it possible to surmount quickly the difficulties and delays caused by the bombing. However, air strikes against the railroad system in North Vietnam have made it more difficult and costly for the Communists to move supplies over the rail lines and caused diversion of considerable manpower resources and critical construction equipment and material. Bomb damage to the rail lines has not seriously curtailed the flow of military supplies into NVN.

6. (S) Heavy attacks against roads and trucks have continued. In June, the ratio of trucks destroyed or damaged to those sighted decreased to less than 1 to 4 as compared 1 to 2 in May; however, the number of vehicles damaged and destroyed was the highest recorded for a one month period since the commencement of armed reconnaissance. Vehicle concentrations in Military Region IV have ranged from 25 to 100 vehicles. This is the first time concentrations of such size have been sighted in the area since early 1966. They reflect a sizeable North Vietnamese effort to move supplies southward into and throughout Military Region IV.

7. (S/NFD) All significant motorable routes south and west of the Hanoi complex have been subjected to multiple attacks since the inception of ROLLING THUNDER missions and all major bridge crossings

have been struck with varying degrees of damage. The steady flow of traffic has been prevented by intermittent stoppages at blocked road segments and damaged stream crossings. The continued interdiction of the roads, particularly south of the 20th parallel, has forced the North Vietnamese government to employ thousands of people in road maintenance and damage recovery. Massive efforts in new road development and the expansion of the existing network have been made to obtain more flexibility for through movements. The continued addition of new alternate and bypass routes is alleviating the reduction of route capacity of the original road net caused by air interdiction. At this point in time, road capacity still exceeds the demand for logistic support over NVN LOC's. Possibly more disruptive and retarding to the North Vietnamese effort has been the cumulative loss of about 2,000 transport vehicles (including those destroyed in the Laos corridor) leaving a current estimated North Vietnamese inventory of between 11,000-12,000.

8. (S) Aerial operations against waterway craft were concentrated primarily south of the 20th parallel. In June, a total of 1,065 craft were sighted and 640 were reported struck. The heaviest waterway strikes were against the intra-coastal waterway between Vinh and Thanh Hoa, resulting in periodic disruption of through waterway movement on this important north-south route and possible diversion and re-routing of transport to coastal routes,

where a slight increase in traffic was apparent. The cumulative effect of ROLLING THUNDER to date, however, has not significantly reduced waterborne transport operations.

9. (S) The sinking of three North Vietnamese Navy Motor Torpedo Boats (MTBs) by USN aircraft on 1 July, reduced the number of MTBs in the current naval order of battle to nine and will weaken the coastal defense force. In addition, the loss of three MTBs plus the capture of 19 crewmen and the deaths of other crewmen will probably further damage the North Vietnam Navy's already low morale. Additional air strikes on 7 July attacked at least four naval craft, ^{two of which were} tentatively identified as submarine chasers, of which two are believed to have been sunk. This would reduce the number of submarine chasers by one-half.

Leadership and Public Reactions

10. (S/NFD) The recent US air strikes against targets in the Hanoi-Haiphong area do not appear to have weakened the North Vietnamese leadership's resolve to continue to prosecute the war. Propaganda pronouncements coming from Hanoi, including a 27 June interview granted by Ho Chi Minh to a Soviet correspondent, have declared that the North Vietnamese are as determined as ever to continue the war -- despite all difficulties -- until a victory on Communist terms can be achieved. Recent diplomatic reporting on the leadership's resolve has varied in opinion but, on balance, does not indicate that the

regime is prepared to change its position.

11. (S) At the same time, the Hanoi leadership appears to be taking note of the effects the bombing raids are having on popular morale and is initiating steps to prevent or curb, if possible, any decline in the fighting spirit of the people. Regime propaganda on the POL strikes has claimed specifically that the raids would not have any effect on the morale of the people. To bolster popular fighting spirit and possibly to pave the way for future trials, the leadership recently staged a parade of a number of captured US pilots through the streets of Hanoi and gave wide coverage to the angry mood of the people of the city and their cries for vengeance and the defeat of the Americans. In addition, since the POL strikes, North Vietnamese fighter aircraft have been patrolling at low altitude in the Hanoi area during daylight hours to bolster popular morale and to show North Vietnamese resolve.

12. (S) Regime concern over the status of morale may reflect its realization that the cumulative effects of the bombing raids are now beginning to be felt by large segments of the population. These effects include shortages of certain foodstuffs, limited quantities of rationed goods, and sharp rises in the prices of unrationed products. These elements, coupled with static wages, disruption of the economy, and diversion to war-associated activities may soon have a worsening effect on popular morale. In addition to the above,

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there is also the possibility that the reported large scale evacuation from Hanoi ordered by the regime shortly after the initial POL strike, coupled with the hardships encountered in relocation may tend to further undermine morale. Presently, however, there continues to be no hard evidence of real alarm in Hanoi or that morale in North Vietnam has slipped to the extent that it would force the regime to change its policy of continuing the war.

Effects on the Economy

13. (S/NFD) The attacks on the petroleum facilities will make the operation of the economy more difficult and costly. Even before these attacks, the bombings were causing increasing disruption of economic activity. There was growing evidence of delays in transport, local shortages and rising prices of certain foods, shortages of electricity, and the constant diversion of investment and manpower to the repair of bomb damage. As early as May, Politburo member Pham Hung had admitted that the economy experienced difficulties in 1965 as a result of the bombing and suggested that many of the same problems existed in 1966. He particularly emphasized the problems in the distribution of local products and in the receipt of foreign aid shipments resulting from damage to the transportation system. Pham also admitted that the regime has had to scale down its ambitious plans to develop heavy industry although some new industrial construction is continuing. Both agricultural and industrial production

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grew more slowly in 1965 than in 1964 and the prospects now for growth in 1966 are poor. The economy, nevertheless, is still able to provide the essential needs of the population. The stepped-up program of military and economic assistance from other Communist countries has also enabled Hanoi to proceed with plans for some economic development.

14. (S) Economic assistance to North Vietnam from Communist countries has averaged some \$100 million annually since 1955 and probably will increase considerably in 1966 as a result of extensions of emergency aid to support the war effort. Military assistance has been increasing since the end of 1964, and in 1965 deliveries of weapons and ammunition reached an estimated value of \$250-\$350 million, at least one-half the total of such deliveries since 1955. In addition, the USSR and Communist China have been providing technical assistance to North Vietnam and are assisting in the construction of airfields and other facilities there.

15. (S) Food shortages and rising food prices apparently are becoming more prevalent throughout North Vietnam. Pham has admitted that inflation in agricultural prices will be a continuing problem for the regime and another North Vietnamese official has urged the peasants to produce more and eat less. Although poor weather has been an important factor in these difficulties, air strikes have interfered with the distribution of food and fertilizer, interfered with normal farming schedules, and reduced the availability of

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manpower. The probable shortfall in the spring rice crop together with other shortages in food could necessitate an increase in food imports and further complicate the regime's supply difficulties.

16. (S) The value of North Vietnam's seaborne exports of apatite, coal, and cement was below the monthly pre-strike average by some \$1.5 million in June. The estimated cumulative loss in exports since the inception of the air strikes is about \$9.2 million.* The volume of coal shipped in June was only 36 per cent of the average monthly volume for 1965 because of damage inflicted against facilities at the major coal port of Cam Pha during two air strikes in April 1966. No apatite has been exported since August 1965 because of repeated interdiction of the rail line leading from the mines at Lao Cai. Although this line has been open periodically, North Vietnam apparently has lost its major customers for apatite because of its inability to provide a reliable flow of shipments.

17. (S) Reports of power shortages in Hanoi strongly suggest that there has been inadequate reserve generating capacity to cover all demands for electricity since the April restrike against the Uong Bi thermal power plant. Haiphong, which is also served by the Uong Bi plant, probably is in a similar situation. Rationing of electric

* Data revisions resulted in a \$0.3 million decrease in last month's estimate.

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power probably has been necessary with non-essential consumers, such as private residences, commercial enterprises, and perhaps public transportation, being denied service in peak load periods. It is estimated, however, that the power supply to industry and to essential services has not been curtailed significantly, if at all, and that the available supply of power is sufficient to meet the demand in both cities except for peak periods. June 1966 photography shows virtually no progress in reconstruction of the Nam Dinh power plant since the last air strike in August 1965. With this plant inoperative and the probability that Nam Dinh has been denied power from the main transmission network in view of the power restrictions in Hanoi, it is likely that the Nam Dinh area is suffering a severe power shortage. This is further supported by the apparent failure to effect repairs or even to clear away rubble at the large Nam Dinh Textile Mill which was slightly damaged by air strikes in July 1965.

18. (S/NFD) Direct losses caused by air strikes against economic and military facilities and equipment continue to increase. Measured in terms of estimated reconstruction or replacement cost these cumulative losses are now estimated at some 86 million dollars as shown in the tabulation below.

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<u>Economic Facilities and Equipment</u>		<u>Military Facilities and Equipment</u>	
<u>Targets</u>	<u>Million Dollars</u>	<u>Targets</u>	<u>Million Dollars</u>
Railroad/Highway Bridges <u>1/</u>		Barracks	16.2
Reconstruction	12.2	Ammunition Storage	4.5
Temporary Repairs	2.9 <u>2/</u>	Supply Depots	3.1
Transportation Equipment	14.2 <u>3/</u>	Radar and Communications	1.1
Railroad Yards and Ports	1.0	Naval Bases	0.8
Electric Power Plants	6.3	SAM Sites	0.9
Petroleum Storage Facilities	2.2 <u>4/</u>	Aircraft	10.8
Manufacturing Facilities	1.5	Airfields	0.4
		Naval Craft	7.2 <u>5/</u>
		Miscellaneous Targets of Armed Reconnaissance	0.7
Total	40.3		45.7

1/ The estimate in this category is incomplete because of inadequate post-strike photography.

2/ Includes 2.0 million dollars expended to date on temporary repairs and 0.9 million dollars required to provide temporary repairs for structures damaged but not yet restored to operable condition.

3/ Excludes destruction and damage to trucks in Laos.

4/ Excludes destruction and damage to support facilities.

5/ Includes only destruction of and heavy damage to North Vietnamese naval craft in May-July 1966.

Measurable indirect losses amount to about \$12.7 million made up principally of losses of foreign exchange earnings of \$9.2 million and losses in the 1965 fall rice crop of \$3.5 million. In addition to these measurable indirect losses, there are many other losses and costs to the economy and the military establishment which have developed as a consequence of the air strikes, but which cannot be assigned values. These would include the loss of production and the lower productivity of labor resulting from the dispersal of industry, time lost from work as a consequence of civil defense measures, and loss of production caused by temporary shortages of electric power.

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DIA RESULTS OF STRIKES ON NVN TARGETS a/ THRU 13 JULY 1966 TABLE 350 (HOTEL)

Fixed Targets	Total Targets		Targets Struck		No. Attacks	Strike Sorties	% Of National Capacity	
	No. c/	Targeted No(*) % d/	No(*) % d/				Destroyed	Inactive e/
Barracks	443 man	62 39.27	45 23	1967	2448		14.87	5.56
Ammo Depots	112.6 MT	18 96.7	13 75.7	51	1143		35.67	37.51
POL Storage	202.8 MT	13 96.0	11 89.3	22	318		65.5	
Supply Depots	10550 sqft	26 38.6	17 19.0	50	599		10.0	2.0
Power Plants	176 KW	19 97.6	6 27.5	25	238		27.5	
Maritime Ports	7.8 ST/Dy	10 95	5 28	17	219		10.37	2.63
RR Yards	33.7 ST/Dy	4 78	2 19	16	131		9.3	
Explosive Plant	1 MT	1 100	1 100	3	28		71.	
Airfields	23		4	12	359			
Naval Bases	15		2	15	196			
Bridges	822		46	168	2269			
Commo Install	45		2	2	15			
Radar Sites	50		15	61	404			
SAM Sites	115		41	50	303			
Locks & Dams	91		2	2	10			
Ferries	34		11	7	44			

Total Sorties: 8,724

Armed Recce Sorties

41,221

Results f/

	Destroyed	Damaged
Vessels	1,794	2,970
Vehicles	1,081	1,108
RR Stock	797	1,056

- a/ Assessments are based on best information received, will be refined as more accurate information becomes available.
- b/ Strike plus flak suppression sorties. Some applied to multiple targets; in this summary assigned to principal target.
- c/ National capacity in 1,000's where measurement shown.
- d/ Percentages of national capacity where appropriate.
- e/ Also numerous attacks during armed recce and other missions.
- f/ Also numerous installations, AA sites, bridges, etc, attacked and road and rail cuts made
- g/ Per cent inactive due to dismantling or abandonment of facilities as a result of air strikes.
- (*) These columns are not additive, since the number of installations, both targeted and struck in some cases, apply to more than one category of targets. (i.e., barracks, supply and ammo depots).

NOTE: For comparative purposes.

US worldwide ammo storage capacity is 6,936,000 metric tons (CONUS 5,719,000 MT).

US worldwide military POL storage capacity is 15,452,000 MT; national US commercial

capacity is 151,325,000 MT; approximate average \$ value of 1 MT of POL products is \$28.

US worldwide military supply depot covered storage space is 137,100,000 sq. ft.

(CONUS 121,300,000 sq. ft.).

Total kilowatt capacity of power plants serving metropolitan areas: New York - 7.6

million, Chicago - 2.8 million, Washington, DC and NY suburbs - 3.4 million.

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SOURCE: DIA

TAB A